

## CONTENTS

Vol. 169

JULY 1972

Whole No. 442

	Page
Plurisubharmonic functions and convexity properties for general function algebras By C. E. RICKART .....	1
A characterization of <i>M</i> -spaces in the class of separable simplex spaces By ALAN GLEIT .....	25
Ascent, descent, and commuting perturbations By M. A. KAASHOEK and D. C. LAY .....	35
A comparison principle for terminal value problems in ordinary differential equations By THOMAS G. HALLAM .....	49
On the ideal structure of Banach algebras By WILLIAM E. DIETRICH, JR. ....	59
A sheaf-theoretic duality theory for cylindric algebras By STEPHEN D. COMER .....	75
Holomorphic maps into complex projective space omitting hyperplanes By MARK L. GREEN .....	89
Close-to-convex multivalent functions with respect to weakly starlike functions By DAVID STYER .....	105
Harmonic analysis on <i>F</i> -spaces with a basis By J. KUELBS and V. MANDREKAR .....	113
Wall manifolds with involution By R. J. ROWLETT .....	153
An algebra of distributions on an open interval By HARRIS S. SHULTZ .....	163
A notion of capacity which characterizes removable singularities By REESE HARVEY and JOHN C. POLKING .....	183
Radon-Nikodym theorems for vector valued measures By JOSEPH KUPKA .....	197
On antiflexible algebras By DAVID J. RODABAUGH .....	219
Müntz-Szász type approximation and the angular growth of lacunary integral functions By J. M. ANDERSON .....	237

Continued on inside cover

## CONTENTS

Vol. 169

JULY 1972

Whole No. 442

	Page
Plurisubharmonic functions and convexity properties for general function algebras By C. E. RICKART .....	1
A characterization of <i>M</i> -spaces in the class of separable simplex spaces By ALAN GLEIT .....	25
Ascent, descent, and commuting perturbations By M. A. KAASHOEK and D. C. LAY .....	35
A comparison principle for terminal value problems in ordinary differential equations By THOMAS G. HALLAM .....	49
On the ideal structure of Banach algebras By WILLIAM E. DIETRICH, JR. ....	59
A sheaf-theoretic duality theory for cylindric algebras By STEPHEN D. COMER .....	75
Holomorphic maps into complex projective space omitting hyperplanes By MARK L. GREEN .....	89
Close-to-convex multivalent functions with respect to weakly starlike functions By DAVID STYER .....	105
Harmonic analysis on <i>F</i> -spaces with a basis By J. KUELBS and V. MANDREKAR .....	113
Wall manifolds with involution By R. J. ROWLETT .....	153
An algebra of distributions on an open interval By HARRIS S. SHULTZ .....	163
A notion of capacity which characterizes removable singularities By REESE HARVEY and JOHN C. POLKING .....	183
Radon-Nikodym theorems for vector valued measures By JOSEPH KUPKA .....	197
On antiflexible algebras By DAVID J. RODABAUGH .....	219
Müntz-Szász type approximation and the angular growth of lacunary integral functions By J. M. ANDERSON .....	237

Continued on inside cover

XU



A characterization of badly approximable functions	
By S. J. POREDA .....	249
Torsion differentials and deformation	
By D. S. RIM .....	257
A method of symmetrization and applications. II	
By DOV AHARONOV and W. E. KIRWAN .....	279
On the finitely generated subgroups of an amalgamated product of two groups	
By R. G. BURNS .....	293
Spaces of set-valued functions	
By DAVID N. O'STEEN .....	307
Complex structures on Riemann surfaces	
By GARO KIREMDJIAN .....	317
Characteristic classes of stable bundles of rank 2 over an algebraic curve	
By P. E. NEWSTEAD .....	337
Endomorphism rings of reduced torsion-free modules over complete discrete valuation rings	
By WOLFGANG LIEBERT .....	347
Lattice-ordered injective hulls	
By STUART A. STEINBERG .....	365
Modular representations of metabelian groups	
By B. G. BASMAJI .....	389
Transverse cellular mappings of polyhedra	
By ETHAN AKIN .....	401
Diffusion and Brownian motion on infinite-dimensional manifolds	
By HUI-HSIUNG KUO .....	439
Hypersurfaces of nonnegative curvature in a Hilbert space	
By LEO JONKER .....	461
The structure of pseudocomplemented distributive lattices. III: Injective and absolute subretracts	
By G. GRÄTZER and H. LAKSER .....	475
Abelian subgroups of finite $p$ -groups	
By SUSAN CLAIRE DANCS .....	489
A non-Noetherian factorial ring	
By JOHN DAVID .....	495
A note on the geometric means of entire functions of several complex variables	
By P. K. KAMTHAN .....	503



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT

HARRY KESTEN

ALISTAIR H. LACHLAN

DOCK S. RIM

SHLOMO STERNBERG

FRANÇOIS TREVES

VOLUME 169

JULY 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

**Printed in the United States of America**

## TABLE OF CONTENTS

VOL. 169	JULY 1972	Page
AHARONOV, DOV and KIRWAN, W. E. A method of symmetrization and applications. II .....		279
AKIN, ETHAN. Transverse cellular mappings of polyhedra .....		401
ANDERSON, J. M. Müntz-Szasz type approximation and the angular growth of lacunary integral functions .....		237
BASMAJI, B. G. Modular representations of metabelian groups .....		389
BURNS, R. G. On the finitely generated subgroups of an amalgamated product of two groups .....		293
COMER, STEPHEN D. A sheaf-theoretic duality theory for cylindric algebras..		75
DANCS, SUSAN CLAIRE. Abelian subgroups of finite $p$ -groups .....		489
DAVID, JOHN. A non-Noetherian factorial ring .....		495
DIETRICH, WILLIAM E., JR. On the ideal structure of Banach algebras .....		59
GLEIT, ALAN. A characterization of $M$ -spaces in the class of separable simplex spaces .....		25
GRÄTZER, G. and LAKSER, H. The structure of pseudocomplemented distributive lattices. III: Injective and absolute subretracts .....		475
GREEN, MARK L. Holomorphic maps into complex projective space omitting hyperplanes .....		89
HALLAM, THOMAS G. A comparison principle for terminal value problems in ordinary differential equations .....		49
HARVEY, REESE and POLKING, JOHN C. A notion of capacity which characterizes removable singularities .....		183
JONKER, LEO. Hypersurfaces of nonnegative curvature in a Hilbert space ...		461
KAASHOEK, M. A. and LAY, D. C. Ascent, descent and commuting perturbations .....		35
KAMTHAN, P. K. A note on the geometric means of entire functions of several complex variables .....		503
KIREMIDJIAN, GARO. Complex structures on Riemann surfaces .....		317
KIRWAN, W. E. and AHARONOV, DOV. A method of symmetrization and applications. II .....		279
KUELBS, J. and MANDREKAR, V. Harmonic analysis on $F$ -spaces with a basis		113
KUO, HUI-HSIUNG. Diffusion and Brownian motion on infinite-dimensional manifolds .....		439
KUPKA, JOSEPH. Radon-Nikodym theorems for vector valued measures .....		197
LAKSER, H. and GRÄTZER, G. The structure of pseudocomplemented distributive lattices. III: Injective and absolute subretracts .....		475
LAY, D. C. and KAASHOEK, M. A. Ascent, descent and commuting perturbations .....		35

LIEBERT, WOLFGANG. Endomorphism rings of reduced torsion-free modules over complete discrete valuation rings .....	347
MANDREKAR, V. and KUELBS, J. Harmonic analysis on <i>F</i> -spaces with a basis .....	113
NEWSTEAD, P. E. Characteristic classes of stable bundles of rank 2 over an algebraic curve .....	337
O'STEEN, DAVID N. Spaces of set-valued functions .....	307
POLKING, JOHN C. and HARVEY, REESE. A notion of capacity which characterizes removable singularities .....	183
POREDA, S. J. A characterization of badly approximable functions .....	249
RICKART, C. E. Plurisubharmonic functions and convexity properties for general function algebras .....	1
RIM, D. S. Torsion differentials and deformation .....	257
RODABAUGH, DAVID J. On antiflexible algebras .....	219
ROWLETT, R. J. Wall manifolds with involution .....	153
SHULTZ, HARRIS S. An algebra of distributions on an open interval .....	163
STEINBERG, STUART A. Lattice-ordered injective hulls .....	365
STYER, DAVID. Close-to-convex multivalent functions with respect to weakly starlike functions .....	105

XU

## CONTENTS

Vol. 170

AUGUST 1972

Whole No. 443

	Page
Class groups of integral group rings By I. REINER and S. ULLOM .....	1
Second-order time degenerate parabolic equations By MARGARET C. WAID .....	31
Stone's topology for pseudocomplemented and bicomplemented lattices By P. V. VENKATANARASIMHAN .....	57
Approximation in operator algebras on bounded analytic functions By M. W. BARTELT .....	71
Approximating embeddings of polyhedra in codimension three By J. L. BRYANT .....	85
Primitive ideals of $C^*$ -algebras associated with transformation groups By ELLIOT C. GOOTMAN .....	97
The separable closure of some commutative rings By ANDY R. MAGID .....	109
Projective moduli and maximal spectra of certain quotient rings By ARON SIMIS .....	125
An eigenfunction expansion for a nonselfadjoint, interior point boundary value problem By ALLAN M. KRALL .....	137
Extreme limits of compacta valued functions By T. F. BRIDGLAND, JR. .....	149
Norm of a derivation on a von Neumann algebra By P. GAJENDRAGADKAR .....	165
Converse theorems and extensions in Chebyshev rational approximation to certain entire functions in $[0, +\infty)$ By G. MEINARDUS, A. R. REDDY, G. D. TAYLOR and R. S. VARGA ..	171
Solid $k$ -varieties and Henselian fields By GUSTAVE EFROYMSON .....	187
Operators on tensor products of Banach spaces By TAKASHI ICHINOSE .....	197
Invariant polynomials on Lie algebras of inhomogeneous unitary and special orthogonal groups By S. J. TAKIFF .....	221
Non-Hopfian groups with fully invariant kernels. I By MICHAEL ANSHEL .....	231
Remarks on the wave front of a distribution By AKIVA GABOR .....	239

*(Continued on inside back cover)*

XU



(Continued from back cover)

Regular semigroups satisfying certain conditions on idempotents and ideals	245
By MARIO PETRICH	245
Maximal regular right ideal space of a primitive ring	269
By KWANGIL KOH and JIANG LUH	269
Products of weakly-N-compact spaces	279
By MILTON ULMER	279
Invariant means on a class of von Neumann algebras	285
By P. F. RENAUD	285
Homology in varieties of groups. IV	293
By C. R. LEEDHAM-GREEN and T. C. HURLEY	293
Infinite dimensional Jordan operators and Sturm-Liouville conjugate point theory	305
By J. WILLIAM HELTON	305
Deformations of integrals of exterior differential systems	333
By DOMINIC S. P. LEUNG	333
Limit behavior of solutions of stochastic differential equations	359
By AVNER FRIEDMAN	359
On Knaster's conjecture	385
By R. P. JERRARD	385
The completion of an abelian category	403
By H. B. STAUFFER	403
Piecewise linear critical levels and collapsing	415
By C. KEARTON and W. B. R. LICKORISH	415
Exponential decay of weak solutions for hyperbolic systems of first order with discontinuous coefficients	425
By HANG-CHIN LAI	425
Rings with property D	437
By EBEN MATLIS	437
<i>m</i> -symplectic matrices	447
By EDWARD SPENCE	447
Strictly irreducible *-representations of Banach *-algebras	459
By BRUCE A. BARNES	459
Exterior powers and torsion free modules over discrete valuation rings	471
By DAVID M. ARNOLD	471
Sequences of convergence regions for continued fractions $K(a_n/1)$	483
By WILLIAM B. JONES and R. I. SNELL	483
The number of roots in a simply-connected $H$ -manifold	499
By ROBERT F. BROWN and RONALD J. STERN	499
Erratum to "Subordination principle and distortion theorems on holomorphic mappings in the space $C^n$ "	507
By KYONG T. HAHN	507
Index, Volumes 161-170	1-20



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT

HARRY KESTEN

ALISTAIR H. LACHLAN

DOCK S. RIM

SHLOMO STERNBERG

FRANÇOIS TREVES

VOLUME 170  
AUGUST 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

**Printed in the United States of America**

## TABLE OF CONTENTS

VOL. 170	AUGUST 1972	Page
ANSHEL, MICHAEL.	Non-Hopfian groups with fully invariant kernels. I .....	231
ARNOLD, DAVID M.	Exterior powers and torsion free modules over discrete valuation rings .....	471
BARNES, BRUCE A.	Strictly irreducible *-representations of Banach *-algebras .....	459
BARTELT, M. W.	Approximation in operator algebras on bounded analytic functions .....	71
BRIDGLAND, T. F., JR.	Extreme limits of compacta valued functions .....	149
BROWN, ROBERT F. and STERN, RONALD J.	The number of roots in a simply-connected <i>H</i> -manifold .....	499
BRYANT, J. L.	Approximating embeddings of polyhedra in codimension three .....	85
EFROYMSON, GUSTAVE.	Solid <i>k</i> -varieties and Henselian fields .....	187
FRIEDMAN, AVNER.	Limit behavior of solutions of stochastic differential equations .....	359
GABOR, AKIVA.	Remarks on the wave front of a distribution .....	239
GAJENDRAGADKAR, P.	Norm of a derivation on a von Neumann algebra .....	165
GOOTMAN, ELLIOT C.	Primitive ideals of $C^*$ -algebras associated with transformation groups .....	97
HAHN, KYONG T.	Erratum to "Subordination principle and distortion theorems on holomorphic mappings in the space $C^n$ " .....	507
HELTON, J. WILLIAM.	Infinite dimensional Jordan operators and Sturm-Liouville conjugate point theory .....	305
HURLEY, T. C. and LEEDHAM-GREEN, C. R.	Homology in varieties of groups. IV .....	293
ICHINOSE, TAKASHI.	Operators on tensor products of Banach spaces .....	197
JERRARD, R. P.	On Knaster's conjecture .....	385
JONES, WILLIAM B. and SNELL, R. I.	Sequences of convergence regions for continued fractions $K(a_n/1)$ .....	483
KEARTON, C. and LICKORISH, W. B. R.	Piecewise linear critical levels and collapsing .....	415
KOH, KWANGIL and LUH, JIANG.	Maximal regular right ideal space of a primitive ring .....	269
KRALL, ALLAN M.	An eigenfunction expansion for a nonselfadjoint, interior point boundary value problem .....	137
LAI, HANG-CHIN.	Exponential decay of weak solutions for hyperbolic systems of first order with discontinuous coefficients .....	425
LEEDHAM-GREEN, C. R. and HURLEY, T. C.	Homology in varieties of groups. IV .....	293
LEUNG, DOMINIC S. P.	Deformations of integrals of exterior differential systems .....	333
LICKORISH, W. B. R. and KEARTON, C.	Piecewise linear critical levels and collapsing .....	415

LUH, JIANG and KOH, KWANGIL. Maximal regular right ideal space of a primitive ring .....	269
MAGID, ANDY R. The separable closure of some commutative rings .....	109
MATLIS, EBEN. Rings with property D .....	437
MEINARDUS, G., REDDY, A. R., TAYLOR, G. D. and VARGA, R. S. Converse theorems and extensions in Chebyshev rational approximation to certain entire functions in $[0, +\infty)$ .....	171
PETRICH, MARIO. Regular semigroups satisfying certain conditions on idempotents and ideals .....	245
REDDY, A. R., TAYLOR, G. D., VARGA, R. S. and MEINARDUS, G. Converse theorems and extensions in Chebyshev rational approximation to certain entire functions in $[0, +\infty)$ .....	171
REINER, I. and ULLOM, S. Class groups of integral group rings .....	1
RENAUD, P. F. Invariant means on a class of von Neumann algebras .....	285
SIMIS, ARON. Projective moduli and maximal spectra of certain quotient rings .....	125
SNELL, R. I. and JONES, WILLIAM B. Sequences of convergence regions for continued fractions $K(a_n/1)$ .....	483
SPENCE, EDWARD. $m$ -symplectic matrices .....	447
STAUFFER, H. B. The completion of an abelian category .....	403
STERN, RONALD J. and BROWN, ROBERT F. The number of roots in a simply-connected $H$ -manifold .....	499
TAKIFF, S. J. Invariant polynomials on Lie algebras of inhomogeneous unitary and special orthogonal groups .....	221
TAYLOR, G. D., VARGA, R. S., MEINARDUS, G. and REDDY, A. R. Converse theorems and extensions in Chebyshev rational approximation to certain entire functions in $[0, +\infty)$ .....	171
ULLOM, S. and REINER, I. Class groups of integral group rings .....	1
ULMER, MILTON. Products of weakly- $\aleph_0$ -compact spaces .....	279
VARGA, R. S., MEINARDUS, G., REDDY, A. R. and TAYLOR, G. D. Converse theorems and extensions in Chebyshev rational approximation to certain entire functions in $[0, +\infty)$ .....	171
VENKATANARASIMHAN, P. V. Stone's topology for pseudocomplemented and bicomplemented lattices .....	57
WAID, MARGARET C. Second-order time degenerate parabolic equations .....	31

XU

## CONTENTS

Vol. 171	SEPTEMBER 1972	Whole No. 444
		Page
Extremal length and harmonic functions on Riemann surfaces By CARL DAVID MINDA .....	1	
Applications of bundle map theory By DANIEL HENRY GOTTLIEB .....	23	
The Hochschild homology of complete intersections By KLAUS WOLFFHARDT .....	51	
Differentiable structures on function spaces By NISHAN KRIKORIAN .....	67	
The tangential Cauchy-Riemann complex on spheres By G. B. FOLLAND .....	83	
Banach space bifurcation theory By DAVID WESTREICH .....	135	
Topological types of polynomial differential equations By LAWRENCE MARKUS .....	157	
Symmetrization of distributions and its application. II: Liouville type problem in convolution equations By KUANG-HO CHEN .....	179	
Inductive limits of finite dimensional $C^*$ -algebras By OLA BRATTELI .....	195	
A decomposition for combinatorial geometries By THOMAS H. BRYLAWSKI .....	235	
Radial limit sets on the torus By LAURENCE D. HOFFMAN .....	283	
Regular overrings of regular local rings By JUDITH SALLY .....	291	
Irreducible representations of the $C^*$ -algebra generated by an $n$ -normal operator By JOHN W. BUNCE and JAMES A. DEDDENS .....	301	
Automorphisms of a free associative algebra of rank 2. II By ANASTASIA J. CZERNIAKIEWICZ .....	309	
On the evaluation of Brewer's character sums By REINALDO E. GIUDICI, JOSEPH B. MUSKAT and STANLEY F. ROBINSON .....	317	
Some asymptotic fixed point theorems By ROGER D. NUSSBAUM .....	349	

*Continued on inside cover*

XU



The finiteness of $I$ when $R[X]/I$ is flat	
By JACK OHM and DAVID E. RUSH .....	377
Analytic capacity and approximation problems	
By A. M. DAVIE .....	409
Approximation on disks	
By KENNETH JOHN PRESKENIS .....	445
Analytic continuation of Eisenstein series	
By JOSEPH LEWITTES .....	469
Boundary links and an unlinking theorem	
By M. A. GUTIÉRREZ .....	491
Infinite games with imperfect information	
By MICHAEL ORKIN .....	501



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT

HARRY KESTEN

ALISTAIR H. LACHLAN

DOCK S. RIM

SHLOMO STERNBERG

FRANÇOIS TREVES

VOLUME 171  
SEPTEMBER 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

Printed in the United States of America

## TABLE OF CONTENTS

VOL. 171	SEPTEMBER 1972	Page
BRATTELI, OLA.	Inductive limits of finite dimensional $C^*$ -algebras .....	195
BRYLAWSKI, THOMAS H.	A decomposition for combinatorial geometries ....	235
BUNCE, JOHN W. and DEDDENS, JAMES A.	Irreducible representations of the $C^*$ -algebra generated by an $n$ -normal operator .....	301
CHEN, KUANG-HO.	Symmetrization of distributions and its application. II: Liouville type problem in convolution equations .....	179
CZERNIAKIEWICZ, ANASTASIA J.	Automorphisms of a free associative algebra of rank 2. II .....	309
DAVIE, A. M.	Analytic capacity and approximation problems .....	409
DEDDENS, JAMES A. and BUNCE, JOHN W.	Irreducible representations of the $C^*$ -algebra generated by an $n$ -normal operator .....	301
FOLLAND, G. B.	The tangential Cauchy-Riemann complex on spheres .....	83
GIUDICI, REINALDO E., MUSKAT, JOSEPH B. and ROBINSON, STANLEY F.	On the evaluation of Brewer's character sums .....	317
GOTTLIEB, DANIEL HENRY.	Applications of bundle map theory .....	23
GUTIÉRREZ, M. A.	Boundary links and an unlinking theorem .....	491
HOFFMAN, LAURENCE D.	Radial limit sets on the torus .....	283
KRIKORIAN, NISHAN.	Differentiable structures on function spaces .....	67
LEWITTES, JOSEPH.	Analytic continuation of Eisenstein series .....	469
MARKUS, LAWRENCE.	Topological types of polynomial differential equa- tions .....	157
MINDA, CARL DAVID.	Extremal length and harmonic functions on Riemann surfaces .....	1
MUSKAT, JOSEPH B., ROBINSON, STANLEY F. and GIUDICI, REINALDO E.	On the evaluation of Brewer's character sums .....	317
NUSSBAUM, ROGER D.	Some asymptotic fixed point theorems .....	349
OHM, JACK and RUSH, DAVID E.	The finiteness of $I$ when $R[X]/I$ is flat .....	377
ORKIN, MICHAEL.	Infinite games with imperfect information .....	501
PRESKENIS, KENNETH JOHN.	Approximation on disks .....	445
ROBINSON, STANLEY F., GIUDICI, REINALDO E. and MUSKAT, JOSEPH B.	On the evaluation of Brewer's character sums .....	317
RUSH, DAVID E. and OHM, JACK.	The finiteness of $I$ when $R[X]/I$ is flat .....	377
SALLY, JUDITH.	Regular overrings of regular local rings .....	291
WESTREICH, DAVID.	Banach space bifurcation theory .....	135
WOLFFHARDT, KLAUS.	The Hochschild homology of complete intersections	51

## CONTENTS

Vol. 172	OCTOBER 1972	Whole No. 445
		Page
Characteristic classes of real manifolds immersed in complex manifolds		1
By HON-FEI LAI .....		1
Topological properties of paranormal operators on Hilbert space		
By GLENN R. LUECKE .....	35	
Global stability in $n$ -person games		
By LOUIS J. BILLERA .....	45	
Finite commutative subdirectly irreducible semigroups		
By PHILLIP E. MCNEIL .....	57	
Flexible algebras of degree two		
By JOSEPH H. MAYNE .....	69	
Extreme invariant means without minimal support		
By LONNIE FAIRCHILD .....	83	
Lefschetz duality and topological tubular neighbourhoods		
By F. E. A. JOHNSON .....	95	
The action of the automorphism group of $F_2$ upon the $A_6$ - and $\text{PSL}(2, 7)$ -defining subgroups of $F_2$		
By DANIEL STORK .....	111	
The group of homeomorphisms of a solenoid		
By JAMES KEESLING .....	119	
Cohomology of sheaves of holomorphic functions satisfying boundary conditions on product domains		
By ALEXANDER NAGEL .....	133	
Zeros of entire functions in several complex variables		
By RICHARD A. KRAMER .....	143	
Asymptotic behavior of transforms of distributions		
By E. O. MILTON .....	161	
Groups of linear operators defined by group characters		
By MARVIN MARCUS and JAMES HOLMES .....	177	
Maximal ideals in the group algebra of an extension, with applications		
By ARNOLD J. INSEL .....	195	
Varieties of linear topological spaces		
By J. DIESTEL, SIDNEY A. MORRIS and STEPHEN A. SAXON .....	207	
Matrix rings over polynomial identity rings		
By ELIZABETH BERMAN .....	231	
Group rings, matrix rings, and polynomial identities		
By ELIZABETH BERMAN .....	241	
Amalgamations of lattice ordered groups		
By KEITH R. PIERCE .....	249	
Embedding theorems and quasi-linear elliptic boundary value problems for unbounded domains		
By MELVYN S. BERGER and MARTIN SCHECHTER .....	261	

*(Continued on inside back cover)*

XU



*(Continued from back cover)*

Horn classes and reduced direct products	
By RICHARD MANSFIELD .....	279
The access theorem for subharmonic functions	
By R. HORNBLOWER and E. S. THOMAS, JR. ....	287
Ultrafilters and independent sets	
By KENNETH KUNEN .....	299
Group actions on spin manifolds	
By G. CHICHLINSKY .....	307
Stability of group representations and Haar spectrum	
By ROBERT AZENCOTT and WILLIAM PARRY .....	317
Split and minimal abelian extensions of finite groups	
By VICTOR E. HILL .....	329
On Essén's generalization of the Ahlfors-Heins Theorem	
By JOHN L. LEWIS .....	339
Extensions of holomorphic maps	
By PETER KIERNAN .....	347
Multipliers on modules over the Fourier algebra	
By CHARLES F. DUNKL and DONALD E. RAMIREZ .....	357
On Lie's theorem in operator algebras	
By F.-H. VASILESCU .....	365
Integral representation theorems in topological vector spaces	
By ALAN H. SHUCHAT .....	373
Complete multipliers	
By J. S. BYRNES .....	399
The nonstandard theory of topological vector spaces	
By C. WARD HENSON and L. C. MOORE, JR. ....	405
On the nonstandard representation of measures	
By C. WARD HENSON .....	437
Hyponormal operators having real parts with simple spectra	
By C. R. PUTNAM .....	447
Piecewise monotone polynomial approximation	
By D. J. NEWMAN, ELI PASSOW and LOUIS RAYMON .....	465
Homological dimensions of stable homotopy modules and their geometric characterizations	
By T. Y. LIN .....	473
Vector valued absolutely continuous functions on idempotent semigroups	
By RICHARD A. ALÓ, ANDRÉ DEKORVIN and RICHARD J. EASTON .....	491
Zero points of Killing vector fields, geodesic orbits, curvature, and cut locus	
By WALTER C. LYNGE .....	501
Erratum to "Automorphisms of group extensions"	
By CHARLES WELLS .....	507
Erratum to "Oscillation of an operator"	
By ROBERT WHITLEY .....	507
Erratum to "The $(\phi^2)^n$ , field Hamiltonian for complex coupling constant"	
By LON ROSEN and BARRY SIMON .....	508



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT  
DOCK S. RIM

HARRY KESTEN  
SHLOMO STERNBERG

ALISTAIR H. LACHLAN  
FRANÇOIS TREVES

VOLUME 172  
OCTOBER 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

**Printed in the United States of America**

## TABLE OF CONTENTS

VOL. 172	OCTOBER 1972	Page
ALÒ, RICHARD A., DEKORVIN, ANDRE and EASTON, RICHARD J.	Vector valued absolutely continuous functions on idempotent semigroups .....	491
AZENCOTT, ROBERT and PARRY, WILLIAM.	Stability of group representations and Haar spectrum .....	317
BERGER, MELVYN S. and SCHECHTER, MARTIN.	Embedding theorems and quasi-linear elliptic boundary value problems for unbounded domains .....	261
BERMAN, ELIZABETH.	Matrix rings over polynomial identity rings .....	231
	—, Group rings, matrix rings, and polynomial identities .....	241
BILLERA, LOUIS J.	Global stability in $n$ -person games .....	45
BYRNES, J. S.	Complete multipliers .....	399
CHICHILNISKY, G.	Group actions on spin manifolds .....	307
DIESTEL, J., MORRIS, SIDNEY A. and SAXON, STEPHEN A.	Varieties of linear topological spaces .....	207
DUNKL, CHARLES F. and RAMIREZ, DONALD E.	Multipliers on modules over the Fourier algebra .....	357
EASTON, RICHARD J., ALÒ, RICHARD A. and DEKORVIN, ANDRE.	Vector valued absolutely continuous functions on idempotent semigroups .....	491
FAIRCHILD, LONNIE.	Extreme invariant means without minimal support .....	83
HENSON, C. WARD.	On the nonstandard representation of measures .....	437
HENSON, C. WARD and MOORE, L. C., JR.	The nonstandard theory of topological vector spaces .....	405
HILL, VICTOR E.	Split and minimal abelian extensions of finite groups .....	329
HOLMES, JAMES and MARCUS, MARVIN.	Groups of linear operators defined by group characters .....	177
HORNBLOWER, R. and THOMAS, E. S., JR.	The access theorem for subharmonic functions .....	287
INSEL, ARNOLD J.	Maximal ideals in the group algebra of an extension, with applications .....	195
JOHNSON, F. E. A.	Lefschetz duality and topological tubular neighbourhoods ...	95
KEESLING, JAMES.	The group of homeomorphisms of a solenoid .....	119
KIERNAN, PETER.	Extensions of holomorphic maps .....	347
DEKORVIN, ANDRE, EASTON, RICHARD J. and ALÒ, RICHARD A.	Vector valued absolutely continuous functions on idempotent semigroups .....	491
KRAMER, RICHARD A.	Zeros of entire functions in several complex variables .	143
KUNEN, KENNETH.	Ultrafilters and independent sets .....	299
LAI, HON-FEI.	Characteristic classes of real manifolds immersed in complex manifolds .....	1
LEWIS, JOHN L.	On Essén's generalization of the Ahlfors-Heins Theorem .....	339
LIN, T. Y.	Homological dimensions of stable homotopy modules and their geometric characterizations .....	473

LUECKE, GLENN R. Topological properties of paranormal operators on Hilbert space .....	35
LYNGE, WALTER C. Zero points of Killing vector fields, geodesic orbits, curvature, and cut locus .....	501
MCNEIL, PHILLIP E. Finite commutative subdirectly irreducible semigroups .....	57
MANSFIELD, RICHARD. Horn classes and reduced direct products .....	279
MARCUS, MARVIN and HOLMES, JAMES. Groups of linear operators defined by group characters .....	177
MAYNE, JOSEPH H. Flexible algebras of degree two .....	69
MILTON, E. O. Asymptotic behavior of transforms of distributions .....	161
MOORE, L. C., JR. and HENSON, C. WARD. The nonstandard theory of topological vector spaces .....	405
MORRIS, SIDNEY A., SAXON, STEPHEN A. and DIESTEL, J. Varieties of linear topological spaces .....	207
NAGEL, ALEXANDER. Cohomology of sheaves of holomorphic functions satisfying boundary conditions on product domains .....	133
NEWMAN, D. J., PASSOW, ELI and RAYMON, LOUIS. Piecewise monotone polynomial approximation .....	465
PARRY, WILLIAM and AZENCOTT, ROBERT. Stability of group representations and Haar spectrum .....	317
PASSOW, ELI, RAYMON, LOUIS and NEWMAN, D. J. Piecewise monotone polynomial approximation .....	465
PIERCE, KEITH R. Amalgamations of lattice ordered groups .....	249
PUTMAN, C. R. Hyponormal operators having real parts with simple spectra .....	447
RAMIREZ, DONALD E. and DUNKL, CHARLES F. Multipliers on modules over the Fourier algebra .....	357
RAYMON, LOUIS, NEWMAN, D. J. and PASSOW, ELI. Piecewise monotone polynomial approximation .....	465
ROSEN, LON and SIMON, BARRY. Erratum to "The $(\phi^2)^n$ , field Hamiltonian for complex coupling constant" .....	508
SAXON, STEPHEN A., DIESTEL, J. and MORRIS, SYDNEY A. Varieties of linear topological spaces .....	207
SCHECHTER, MARTIN and BERGER, MELVYN S. Embedding theorems and quasi-linear elliptic boundary value problems for unbounded domains ..	261
SHUCHAT, ALAN H. Integral representation theorems in topological vector spaces ..	373
SIMON, BARRY and ROSEN, LON . Erratum to "The $(\phi^2)^n$ , field Hamiltonian for complex coupling constant" .....	508
STORK, DANIEL. The action of the automorphism group of $F_2$ upon the $A_6$ - and $PSL(2, 7)$ -defining subgroups of $F_2$ .....	111
THOMAS, E. S., JR. and HORNBLOWER, R. The access theorem for subharmonic functions .....	287
VASILESCU, F.-H. On Lie's theorem in operator algebras .....	365
WELLS, CHARLES. Erratum to "Automorphisms of group extensions" .....	507
WHITLEY, ROBERT. Erratum to "Oscillation of an operator" .....	507

XU

## CONTENTS

Vol. 173

NOVEMBER 1972

Whole No. 446

	Page
Mean Cesàro summability of Laguerre and Hermite series	1
By EILEEN L. POIANI .....	.....
$\Pi_1^0$ classes and degrees of theories	33
By CARL G. JOCKUSCH, JR. and ROBERT I. SOARE .....	.....
Automorphisms of $\omega_1$ -trees	57
By THOMAS J. JECH .....	.....
Iterated fine limits and iterated nontangential limits	71
By KOHUR GOWRISANKARAN .....	.....
The exceptional subset of a $C_0$ -contraction	93
By DOMINGO A. HERRERO .....	.....
Analytically invariant and bi-invariant subspaces	117
By DOMINGO ANTONIO HERRERO and NORBERTO SALINAS ...	.....
Localizations of HNP rings	137
By JAMES KUZMANOVICH .....	.....
On the classification of simple antiflexible algebras	159
By MAHESH CHANDRA BHANDARI .....	.....
On bounded oscillation and asymptotic expansion of conformal strip mappings	183
By ARTHUR E. O BROCK .....	.....
On the genus of a group	203
By ARTHUR T. WHITE .....	.....
Actions of groups of order $pq$	215
By CONNOR LAZAROV .....	.....
The equivariant Plateau problem and interior regularity	231
By H. BLAINE LAWSON, JR. .....	.....
A class of representations of the full linear group. II	251
By STEPHEN PIERCE .....	.....
On the null-spaces of elliptic partial differential operators in $\mathbf{R}^n$	263
By HOMER F. WALKER .....	.....
Asymptotic behavior of linear integrodifferential systems	277
By VIOREL BARBU and STANLEY I. GROSSMAN .....	.....
On the semisimplicity of group rings of solvable groups	289
By C. R. HAMPTON and D. S. PASSMAN .....	.....
Closed subgroups of lattice-ordered permutation groups	303
By STEPHEN H. McCLEARY .....	.....
Some results on parafree groups	315
By YAEL ROTBERG .....	.....

*continued on inside cover*

XU



*continued from back cover*

$0 \leq X^2 \leq X$

By RALPH GELLAR .....	341
On a variation of the Ramsey number	
By GARY CHARTRAND and SEYMOUR SCHUSTER .....	353
A new class of functions of bounded index	
By S. M. SHAH and S. N. SHAH .....	363
Automorphisms of $GL_n(R)$ , $R$ a local ring	
By J. POMFRET and B. R. McDONALD .....	379
Simple groups of order $2^a 3^b 5^c 7^d p$	
By LEO J. ALEX .....	389
The study of commutative semigroups with greatest group-homomorphism	
By TAKAYUKI TAMURA and HOWARD B. HAMILTON .....	401
Functions and integrals	
By J. MALONE .....	421
A Radon-Nikodym theorem for operator-valued measures	
By HUGH B. MAYNARD .....	449
Canonical neighborhoods for topologically embedded polyhedra	
By ROBERT CRAGGS .....	465
On trigonometric series associated with separable, translation invariant subspaces of $L^\infty(G)$	
By RON C. BLEI .....	491
A proof that $\mathcal{C}^2$ and $\mathcal{T}^2$ are distinct measures	
By LAWRENCE R. ERNST .....	501



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT

HARRY KESTEN

ALISTAIR H. LACHLAN

DOCK S. RIM

SHLOMO STERNBERG

FRANÇOIS TREVES

VOLUME 173

NOVEMBER 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

Printed in the United States of America

## TABLE OF CONTENTS

VOL. 173	NOVEMBER 1972	Page
ALEX, LEO J.	Simple groups of order $2^a 3^b 5^c 7^d p$ .....	389
BARBU, VIOREL and GROSSMAN, STANLEY I.	Asymptotic behavior of linear integrodifferential systems .....	277
BHANDARI, MAHESH CHANDRA.	On the classification of simple antiflexible algebras .....	159
BLEI, RON C.	On trigonometric series associated with separable, translation invariant subspaces of $L^\infty(G)$ .....	491
CHARTRAND, GARY and SCHUSTER, SEYMOUR.	On a variation of the Ramsey number .....	353
CRAGGS, ROBERT.	Canonical neighborhoods for topologically embedded polyhedra .....	465
ERNST, LAWRENCE R.	A proof that $\mathcal{C}^2$ and $\mathcal{T}^2$ are distinct measures ...	501
GELLAR, RALPH.	$0 \leq X^2 \leq X$ .....	341
GOWRISANKARAN, KOHUR.	Iterated fine limits and iterated nontangential limits .....	71
GROSSMAN, STANLEY I. and BARBU, VIOREL.	Asymptotic behavior of linear integrodifferential systems .....	277
HAMILTON, HOWARD B. and TAMURA, TAKAYUKI.	The study of commutative semigroups with greatest group-homomorphism .....	401
HAMPTON, C. R. and PASSMAN, D. S.	On the semisimplicity of group rings of solvable groups .....	289
HERRERO, DOMINGO A.	The exceptional subset of a $C_0$ -contraction .....	93
HERRERO, DOMINGO ANTONIO and SALINAS, NORBERTO.	Analytically invariant and bi-invariant subspaces .....	117
JECH, THOMAS J.	Automorphisms of $\omega_1$ -trees .....	57
JOCKUSCH, CARL G., JR. and SOARE, ROBERT I.	$\Pi_1^0$ classes and degrees of theories .....	33
KUZMANOVICH, JAMES.	Localizations of HNP rings .....	137
LAWSON, H. BLAINE, JR.	The equivariant Plateau problem and interior regularity .....	231
LAZAROV, CONNOR.	Actions of groups of order $pq$ .....	215
MALONE, J.	Functions and integrals .....	421
MAYNARD, HUGH B.	A Radon-Nikodým theorem for operator-valued measures .....	449
MCCLEARY, STEPHEN H.	Closed subgroups of lattice-ordered permutation groups .....	303
MCDONALD, B. R. and POMFRET, J.	Automorphisms of $GL_n(R)$ , $R$ a local ring .....	379

OBROCK, ARTHUR E. On bounded oscillation and asymptotic expansion of conformal strip mappings .....	183
PASSMAN, D. S. and HAMPTON, C. R. On the semisimplicity of group rings of solvable groups .....	289
PIERCE, STEPHEN. A class of representations of the full linear group. II .....	251
POIANI, EILEEN L. Mean Cesàro summability of Laguerre and Hermite series .	1
POMFRET, J. and McDONALD, B. R. Automorphisms of $GL_n(R)$ , $R$ a local ring .....	379
ROITBERG, YAEL. Some results on parafree groups .....	315
SALINAS, NORBERTO and HERRERO, DOMINGO ANTONIO. Analytically invariant and bi-invariant subspaces .....	117
SCHUSTER, SEYMOUR and CHARTRAND, GARY. On a variation of the Ramsey number .....	353
SHAH, S. M. and SHAH, S. N. A new class of functions of bounded index ...	363
SHAH, S. N. and SHAH, S. M. A new class of functions of bounded index ...	363
SOARE, ROBERT I. and JOCKUSCH, CARL G., JR. $\Pi_1^0$ classes and degrees of theories .....	33
TAMURA, TAKAYUKI and HAMILTON, HOWARD B. The study of commutative semigroups with greatest group-homomorphism .....	401
WALKER, HOMER F. On the null-spaces of elliptic partial differential operators in $\mathbf{R}^n$ .....	263
WHITE, ARTHUR T. On the genus of a group .....	203

XU

## CONTENTS

Vol. 174

DECEMBER 1972

Whole No. 447

	Page
Equational bases and nonmodular lattice varieties By RALPH MCKENZIE.....	1
Some remarks concerning the varieties generated by the diamond and the pentagon By S. D. COMER AND D. X. HONG .....	45
Topologies of closed subsets By LOUIS NARENS .....	55
Real length functions in groups By NANCY HARRISON .....	77
Smooth embeddings of homologically similar manifolds By DENNIS M. ROSEMAN .....	107
Normed convex processes By STEPHEN M. ROBINSON .....	127
Quasi-complemented algebras By T. HUSAIN AND PAK-KEN WONG .....	141
Cones and Vietoris-Begle type theorems By D. G. BOURGIN .....	155
The Lefschetz fixed point theorem for noncompact locally connected spaces By R. J. KNILL .....	185
Near central automorphisms of abelian torsion groups By JUTTA HAUSEN .....	199
Instability in $\text{Diff}^r(T^3)$ and the nongenericity of rational zeta functions By CARL P. SIMON .....	217
Singular homology as a derived functor By G. S. RINEHART .....	243
Semi- $p$ -functions By J. F. C. KINGMAN .....	257
Algebras of analytic germs By WILLIAM R. ZAME .....	275
A pair of indices for function spaces on the circle By COLIN BENNETT .....	289
Constructive proof of Hilbert's theorem on ascending chains By A. SEIDENBERG .....	305
Strictly regular elements in Freudenthal triple systems By J. C. FERRAR .....	313
The $L^p$ behavior of eigenfunction expansions By HAROLD E. BENZINGER .....	333

(Continued on inside back cover)

XU



*(Continued from back cover)*

Adequate ultrafilters of special Boolean algebras By S. NEGREPONTIS .....	345
A generalization of univalent functions with bounded boundary rotation By EDWARD J. MOULIS, JR. .....	369
<i>Q</i> -composable properties, semigroups and CM-homomorphisms By A. R. BEDNAREK AND K. D. MAGILL, JR. .....	383
Equicontinuity and indivisibility in transformation groups By PING-FUN LAM .....	399
Rings which are almost polynomial rings By PAUL EAKIN AND JAMES SILVER .....	425
Valuations, primes and irreducibility in polynomial rings and rational function fields By RON BROWN .....	451
Generalized eigenfunctions and real axis limits of the resolvent By N. A. DERZKO .....	489
Erratum to "On character sums and power residues" By KARL K. NORTON .....	507



TRANSACTIONS  
OF THE  
AMERICAN MATHEMATICAL SOCIETY

EDITED BY

STEVE ARMENTROUT

HARRY KESTEN

ALISTAIR H. LACHLAN

DOCK S. RIM

SHLOMO STERNBERG

FRANÇOIS TREVES

VOLUME 174  
DECEMBER 1972

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY  
PROVIDENCE, RHODE ISLAND

Printed in the United States of America

## TABLE OF CONTENTS

VOL. 174	DECEMBER 1972	Page
BEDNAREK, A. R. and MAGILL, K. D., JR.	<i>Q</i> -composable properties, semi-groups and CM-homomorphisms .....	383
BENNETT, COLIN.	A pair of indices for function spaces on the circle .....	289
BENZINGER, HAROLD E.	The $L^p$ behavior of eigenfunction expansions ....	333
BOURGIN, D. G.	Cones and Vietoris-Begle type theorems .....	155
BROWN, RON.	Valuations, primes and irreducibility in polynomial rings and rational function fields .....	451
COMER, S. D. and HONG, D. X.	Some remarks concerning the varieties generated by the diamond and the pentagon .....	45
DERZKO, N. A.	Generalized eigenfunctions and real axis limits of the resolvent .....	489
EAKIN, PAUL and SILVER, JAMES.	Rings which are almost polynomial rings	425
FERRAR, J. C.	Strictly regular elements in Freudenthal triple systems .....	313
HARRISON, NANCY.	Real length functions in groups .....	77
HAUSEN, JUTTA.	Near central automorphisms of abelian torsion groups ....	199
HONG, D. X. and COMER, S. D.	Some remarks concerning the varieties generated by the diamond and the pentagon .....	45
HUSAIN, T. and WONG, PAK-KEN.	Quasi-complemented algebras .....	141
KINGMAN, J. F. C.	Semi- $p$ -functions .....	257
KNILL, R. J.	The Lefschetz fixed point theorem for noncompact locally connected spaces .....	185
LAM, PING-FUN.	Equicontinuity and indivisibility in transformation groups	399
MAGILL, K. D., JR. and BEDNAREK, A. R.	<i>Q</i> -composable properties, semi-groups and CM-homomorphisms .....	383
MCKENZIE, RALPH.	Equational bases and nonmodular lattice varieties .....	1
MOULIS, EDWARD J., JR.	A generalization of univalent functions with bounded boundary rotation .....	369
NARENS, LOUIS.	Topologies of closed subsets .....	55
NEGREPONTIS, S.	Adequate ultrafilters of special Boolean algebras .....	345
NORTON, KARL K.	Erratum to "On character sums and power residues" ....	507
RINEHART, G. S.	Singular homology as a derived functor .....	243
ROBINSON, STEPHEN M.	Normed convex processes .....	127
ROSEMAN, DENNIS M.	Smooth embeddings of homologically similar manifolds .....	107
SEIDENBERG, A.	Constructive proof of Hilbert's theorem on ascending chains	305
SILVER, JAMES and EAKIN, PAUL.	Rings which are almost polynomial rings	425
SIMON, CARL P.	Instability in $\text{Diff}'(T^3)$ and the nongenericity of rational zeta functions .....	217
WONG, PAK-KEN and HUSAIN, T.	Quasi-complemented algebras .....	141
ZAME, WILLIAM R.	Algebras of analytic germs .....	275